Early HIV Phase May Be Less Infectious Than Once Thought

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The acute, or very early, period of HIV infection may not be as infectious as prevailing wisdom has led scientists to believe. Consequently, HIV treatment-as-prevention (TasP) is likely to be more effective than previously suggested, because it is less likely to be undermined by transmission during acute infection. Additionally, efforts to identify very early cases of HIV may not be as cost-effective as general attempts to identify any undiagnosed cases of the virus and get people on treatment, which can vastly lower the chance of passing on the virus.

However, these new estimates do not take into account sexual behavior patterns, such as condomless sex with multiple partners, that may be more likely to occur during acute infection, and which may independently make acutely infected people more likely to pass on the virus when compared with the rest of their lives with undiagnosed HIV.

Publishing their findings in PLOS Medicine, researchers analyzed data from the retrospective Rakai community cohort study, which has followed thousands of individuals over the past two decades in Rakai, Uganda, providing them with regular testing, counseling and care. The Rakai study is the only research project to directly measure the infectiousness of HIV during the acute phase.

The researchers in this new analysis used a mathematical model to simulate the acquisition and transmission of HIV among couples in the Rakai cohort.

Their findings were expressed in “excess hazard months,” or EHMacute. The EHMacute is calculated by figuring the average infectiousness of HIV over a 10-year, untreated period, and then estimating how many effective extra months of that average level of infectiousness is contributed by the acute phase’s elevated infectiousness. The researchers estimated that the EHMacute was 8.4. This means that, because of the acute phase’s heightened infectiousness, the first year of infection has the same infectiousness as 20.4 months (12 months plus 8.4 months) of infectiousness across that 10-year average level of infectiousness of living with HIV without treatment.

In a second way of estimating the EHMacute, the researchers drew upon previous papers, one that looked at viral loads during acute infection and another that determined how infectious people are based on their viral load. Then they mapped the viral load patterns over time and used the relationship between viral load and infectiousness to estimate how much more infectious

individuals are during the acute phase when compared with the so-called chronic phase that follows. The result was an estimated EHMacute of 5.6.

Two commonly cited previous estimates of the EHMacute were 31 and 141. The authors of this new paper figured that the primary reasons these earlier estimates were so much higher was because the researchers in those studies did not properly account for the variations in risk of HIV among the mixed-HIV status couples researched, nor did they account for the exclusion of certain couples who were lost to follow-up.

Nevertheless, the authors of the new study caution that because the analysis of the Rakai study of acute transmission involved such a small number of participants, their estimates of EHMacute are uncertain and sit within a wide range: For their 5.6 EHMacute estimate, the estimate range was 3.3 to 9.1 months; and for the 8.4 EHMacute estimate, the estimate range was a relatively unreliable -0.27 to 64 months.

In an accompanying editorial on the paper, Laith Abu-Raddad, PhD, an associate professor of health care policy and research at Weill Cornell Medical College in Ithaca, New York, cautions that the new EHMacute estimates may not translate to certain demographics of people outside of those represented in the Rakai cohort. So these estimates may not help figure infectiousness of newly infected men who have sex with men (MSM), injection drug users, or female sex workers and their clients.

Just the same, Raddad writes that the study authors have “shaken our faith in a result taken for granted for a decade.”

To read the study, click here.

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